Drinking Water Surveillance Program

WALPOLE ISLAND WATER TREATMENT PLANT

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WALPOLE ISLAND
WATER TREATMENT PLANT

DRINKING WATER SURVEILLANCE PROGRAM

ANNUAL REPORT 1988

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EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

WALPOLE ISLAND WATER TREATMENT PLANT
1988 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 52 plants are being monitored.

The Walpole Island Water Treatment Plant is a conventional treatment package plant which treats water from the St. Clair River. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. This plant has a design capacity of 2.51 x 1000 m^3/day and serves a population of 1,900 (2,100 in the summer months).

Raw and Treated water samples were taken monthly and were analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical(Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in June and November.

A summary of results is shown in Table 1.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were all below applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

During 1988 the DWSP sampling results indicated that the Walpole Island Water Treatment Plant produced good quality water at the plant.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP

SUMMARY TABLE BY SCAN

SCAN	RAW TESTS	RAW POSITIVE	RAW %POSITIVE	TREATED TESTS	TREATED POSITIVE	TREATED %POSITIVE
BACTERIOLOGICAL	45	45	100	47	7	14
CHEMISTRY (FLD)	45	45	100	88	88	100
CHEMISTRY (LAB)	308	232	75	302	202	66
METALS	359	164	45	359	146	40
CHLOROAROMATICS	196	0	0	196	0	0
CHLOROPHENOLS	12	0	0	6	0	0
PAH	255	0	0	238	0	0
PESTICIDES & PCB	475	0	0	475	0	0
PHENOLICS	15	2	13	15	2	13
SPECIFIC PESTICIDES	56	0	0	50	0	0
VOLATILES	344	2	0	344	50	14
TOTAL	2110	490		2120	495	

NO HEALTH RELATED GUIDELINES WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

DRINKING WATER SURVEILLANCE PROGRAM

WALPOLE ISLAND WATER TREATMENT PLANT
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INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 52 plants are being monitored.

This plant is located on an Indian Reserve and therefore comes under federal jurisdiction, it is included on the DWSP because it is situated on the St. Clair river. The DWSP was initiated at the Walpole Island Water Treatment Plant in April 1986. Annual reports were published for 1986 (ISBN 0-7729-2568-2) and 1987 (ISSN 0839-8917).

This report contains information and results for 1988.

PLANT DESCRIPTION

The Walpole Island Water Treatment Plant is a "package" conventional treatment plant which treats water from the St. Clair river. The process consists of coagulation, flocculation,

sedimentation, filtration and disinfection. Powdered Activated Carbon (PAC) is used to control taste and odour problems. A polyelectrolyte is used as a coagulation aid.

The treatment plant has a design capacity of 2.5 x 1000 m^3/day and flows on day of sampling ranging from 0.3 x 1000 m^3/day to 0.8 x 1000 m^3/day. This plant serves a population of 1900 people, which rises to about 2,100 during the summer months.

The plant location is shown in Figure 1. Plant process details are shown in Figure 2. General plant information is presented in Table 2.

METHODS

Water samples were obtained from two DWSP approved locations;

i) Raw - The water originated from the lowlift discharge and was sampled through a copper sample line. The sample tap is located on the lowlift discharge pipe situated after the lowlift pumps.

ii) Treated - The water originated from the highlift discharge after addition of all treatment chemicals and was sampled through a copper sample line. The sample tap is located in the plant laboratory.

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM

SITE LOCATION MAP

WALPOLE ISLAND WATER TREATMENT PLANT

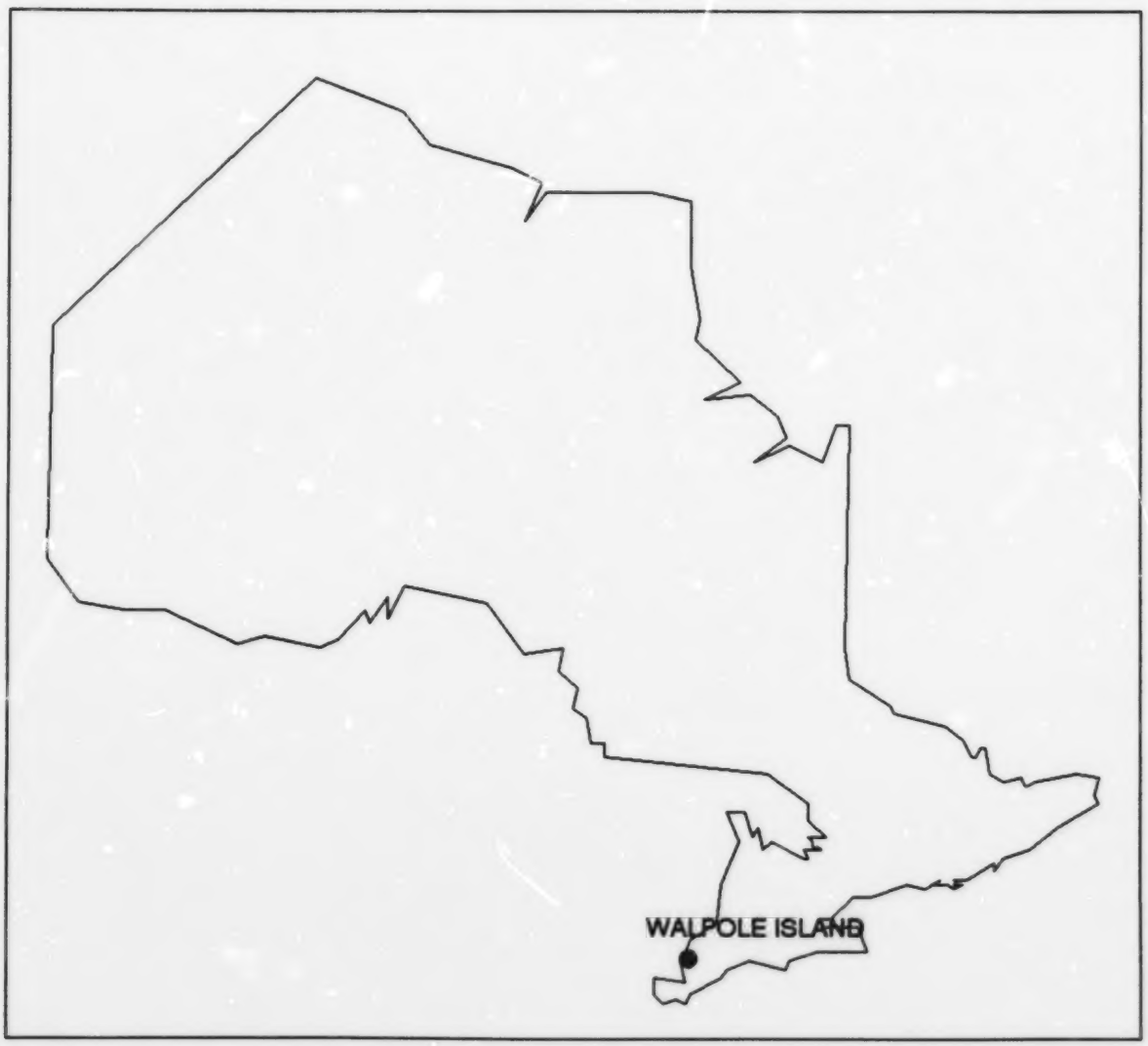

FIGURE 2

WALPOLE ISLAND WATER TREATMENT PLANT

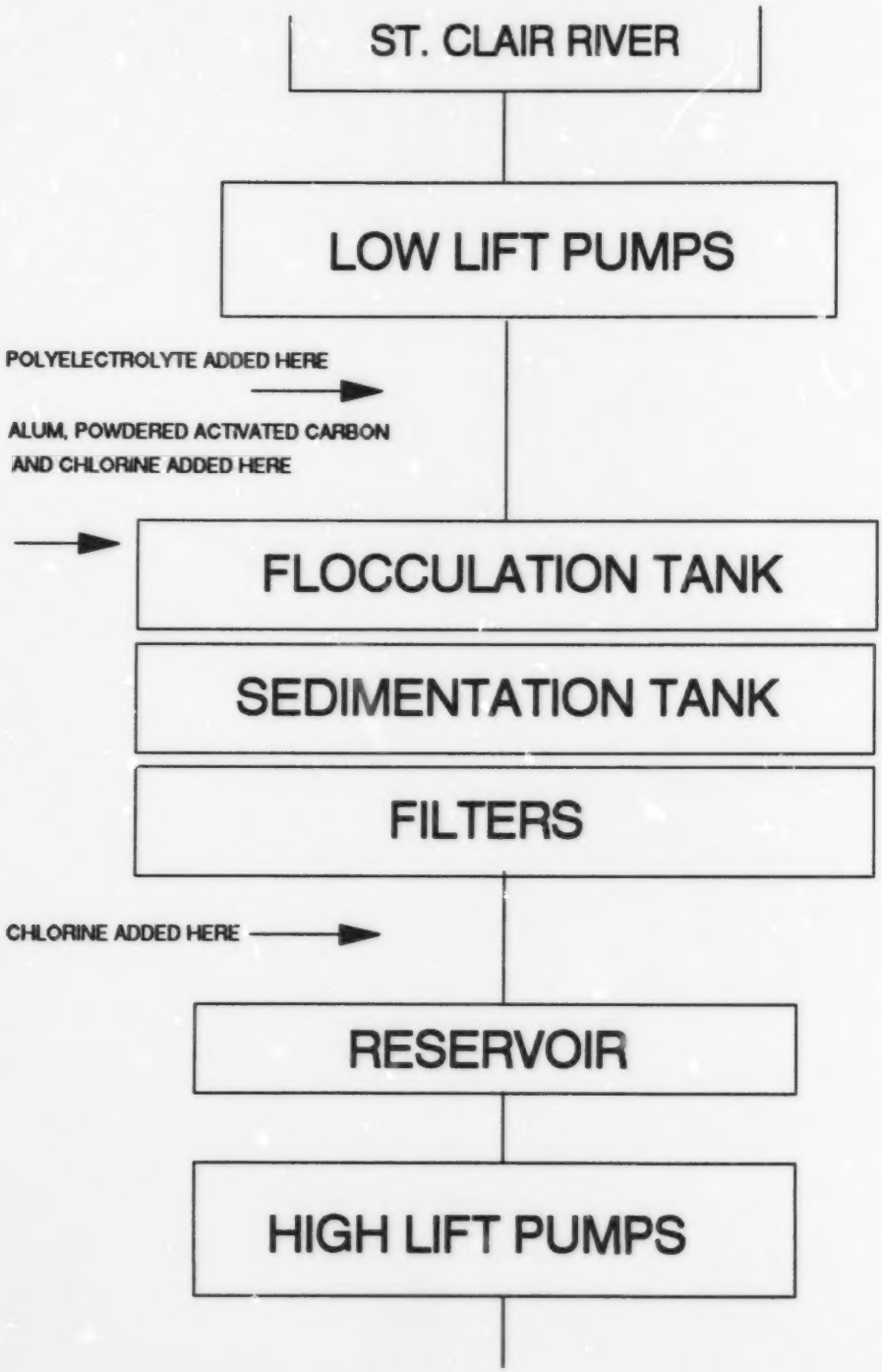

TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

WALPOLE ISLAND WATER TREATMENT PLANT

LOCATION:	WALPOLE ISLAND, ONTARIO N8A 4K9 (519-627-1426)
SOURCE:	RAW WATER SOURCE - ST. CLAIR RIVER
DESIGN CAPACITY:	2.5 (1000 M^3/DAY)
OPERATION:	FEDERAL GOVERNMENT
PLANT SUPERINTENDENT:	J. TOOSHKENIG
MINISTRY REGION:	SOUTHWESTERN
DISTRICT OFFICER:	M. LOOBY

MUNICIPALITY SERVED	POPULATION
WALPOLE ISLAND	1,900
(SUMMER MONTHS)	2,100

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. The retention time was calculated by dividing the volume of water between the two sampling points by the sample day flow. For example, if it was determined that the retention time within the plant was five hours then there would be a five hour interval between the raw and treated sampling.

Stringent DWSP sampling protocols were followed to ensure that all samples are taken in the same manner.

Sample day flow, treatment chemical dosages and field measurements such as Turbidity, Chlorine Residuals, pH and Temperature were recorded on the day of sampling and were entered onto the DWSP data base as submitted.

RESULTS

Water at the Walpole Island Water Treatment Plant was sampled on a monthly basis for approximately 160 parameters. Extra samples were taken in the months of June, November and December in response to a spill situation and for dioxin characterization. Specific

Pesticides and Chlorophenols were analysed in June and November. As a result of an unforeseen emergency the laboratory capacity was exceeded and analysis for volatiles could not be carried out when the samples were received. Since analysis for volatiles is no longer valid after four weeks of storage, volatile results for January, February or March are not available.

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples analysed by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of Environment (MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 lists all parameters analysed on the DWSP.

Associated guidelines and detection limits are also supplied on tables 5 and 6. Parameters are listed alphabetically within each scan.

DISCUSSION

General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWOs) as defined in the 1984 publication (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters, these are currently under review. When an ODWO is not available guidelines/limits from other agencies are consulted. The Parameters Listing System (PALIS) recently published (ISBN 0-7729-4461-X) by the MOE catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

Although some of the parameters measured on DWSP may be present in the raw and treated water as a result of pollution, many of the compounds detected are naturally occuring or are treatment by-products.

Plant operational personnel address occurrences of taste and odour or biological water quality parameters. The DWSP does not assess these aspects of the water supply.

As stated under Results, traces do not indicate quantifiable results as defined by established MOE laboratory analytical reporting protocols. While they can be useful in trend analysis or confirmation of the presence of a specific contaminant that is repeatedly detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant. **DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CARRIED OUT ON POSITIVE RESULTS.**

Bacteriology

Positive results for the Bacteriology scan were present seven times in the treated water. The positive parameters were Standard Plate Count and Total Coliform Background. Based on the limited DWSP sampling, the plant appeared to provide excellent control of the bacteriological quality.

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality; the routine monitoring program usually requires the taking of multiple samples in a given system. Routine bacteriological monitoring, as outlined in the ODWOs is carried out by the operating authority.

Inorganic and Physical Parameters

Laboratory and Field Chemistry

The results for the Laboratory Chemistry and Field Chemistry scans were below all applicable health related ODWOs.

The plant reported field Turbidity results of 1.7 FTU in March, 2.5 FTU in June and 6.8 FTU in December. The laboratory measured turbidity values did not agree with the field results. None of the Laboratory results exceeded the ODWO of 1.0 FTU.

It is desirable that the Temperature of drinking water be less than 15°C; the palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The temperature of the treated water may increase as a result of higher temperatures in the source water. The desired ODWO was exceeded six times in the treated water from June to October.

The Langelier Index is used extensively in estimating the corrosion potential of water. An increasingly negative index indicates the increasing possibility of corrosion. It is considered sound engineering practice to maintain a slightly positive Langelier Index. The Langelier Index for the Walpole Island water is mostly positive.

Metals

The results reported for the Metals scan were all below any applicable health related ODWOs.

Iron, Manganese and Zinc levels were lower in the treated water as compared to the raw water. This is a result of the treatment process. The addition of Alum as a coagulant to the raw water and the resulting coagulation/settling process has been shown to reduce the levels of most metals.

At present, there is no evidence that Aluminum is physiologically harmful and no health limit for drinking water has been specified. The measure of residual Aluminum in the treated water is important to indicate the efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 100 ug/L as Al in the water leaving the plant to avoid problems in the distribution system. Aluminum values exceeded the ODWO operational guideline six times in the treated water.

Organic Parameters

Chloroaromatics

The results of the Chloroaromatics scan showed that no chloroaromatics were detected.

Chlorophenols

The results of the Chlorophenols scan showed that one Chlorophenol was detected:

2,4,6-Trichlorophenol

2,4,6-Trichlorophenol was detected at a trace level, in one of the two treated water samples analyzed.

Pesticides and PCB (Polychlorinated Biphenyls)

The results of the Pesticides and PCB scan showed that no PCBs were detected and that two pesticides were detected:

Alpha BHC

Lindane

Ther are several isomers of BHC (Benzene Hexachloride); gamma BHC is the active ingredient of the pesticide Lindane, while alpha BHC is the most predominant isomer found in surface waters of the Great Lakes Basin, as indicated in results from other water supplies on DWSP.

Alpha BHC was detected at trace levels nine times in the raw water and nine times in the treated water.

Lindane was detected at trace levels, once in the raw water and in the corresponding treated water.

Specific Pesticides

Results of the Specific Pesticides scan showed that none were detected.

Phenolics

The maximum desirable concentration of phenolic substances in drinking water is 2.0 ug/L. This limit has been set primarily to prevent the occurrence of undesirable tastes and odours, particularly in chlorinated water. Phenolics were detected at 3.0 ug/L in the June raw water sample, 1.0 ug/L in the July raw water and 1.2 ug/L in the August treated water and 1.0 ug/L in the December treated water sample. Phenolics were detected at trace levels, ten times in the raw water and eight times in the treated water. Phenolic compounds are present in the aquatic environment as a result of natural and/or industrial processes.

Polynuclear Aromatic Hydrocarbons (PAH)

The results of the PAH scan showed that no PAHs were detected.

Volatiles

The results of the Volatiles scan showed that nine parameters other than Trihalomethanes(THMs), were detected:

Benzene

Toluene

Ethylbenzene

Para-Xylene

Meta-Xylene

Ortho-Xylene

Styrene

1,2-Dichloroethane

Tetrachloroethylene

Benzene was detected at trace levels, five times in the raw water and nine times in the treated water.

Toluene was detected at trace levels, five times in the raw water and eight times in the treated water. The detection of toluene at low, trace levels is a laboratory artifact derived from the analytical methodology. The purge-and-trap analytical technique depends on the purging of the volatile organics in the water sample with helium gas onto a Tenax trapping column. The volatile materials are subsequently thermally desorbed, separated and quantified. Tenax, a toluene-like polymeric material, tends to decompose sporadically upon heating into toluene and other aromatic componenets (ethylbenzene and xylene) giving instrument blanks in the order of 0.05 ug/L.

The detected trace levels of Styrene are also considered to be laboratory artifacts due to the outgassing of monomeric styrene from the polystyrene shipping containers. The sporadic background levels from this source are in the order of 0.05 ug/L.

Ethylbenzene was detected at trace levels, six times in the raw water and nine times in the treated water.

Para-Xylene (P-Xylene) was detected at a trace level, once in the treated water.

Meta-Xylene (M-Xylene) was detected at trace levels, twice in the raw water and six times in the treated water.

Ortho-Xylene (O-Xylene) was detected at trace levels, twice in the raw water and six times in the treated water.

The volatiles listed above are typically found on an occasional basis at other water supplies included on the DWSP usually at trace levels.

1,2-Dichloroethane was detected at a trace level, once in the treated water.

Tetrachloroethylene was detected at trace levels, twice in the raw water and twice in the treated water.

THMs are acknowledged to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised of Chloroform, Chlorodibromomethane and Dichlorobromomethane. Bromoform occurrs occasionally. Results

are reported for the individual compounds as well as for total THMs.

Chloroform, Chlorodibromomethane, Dichlorobromomethane and Total THMs were detected in all of the treated water samples. Bromoform was detected at trace levels. All Total THM occurrences, ranging from 28.2 ug/L to 52 ug/L, were well below the ODWO of 350 ug/L. THMs were detected at trace levels, three times in the raw water.

CONCLUSIONS

The Walpole Island Water Treatment plant for the sample year of 1988 produced good quality water at the plant.

No health related guidelines, for organic or inorganic parameters, were exceeded.

Comparison with the results from the DWSP for 1986 and 1987 show that the raw and treated water quality has remained consistent.

RECOMMENDATIONS

One recommendation can be made:

1) Consideration should be given to reducing the frequency of sampling.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM MALPOLE ISLAND WTP SAMPLE DAY CONDITIONS FOR 1988

	SAMPLE DAY CONDITIONS		TREATMENT CHEMICAL DOSAGES (MG/L)				
			COAGULATION	ADSORPTION	COAGULATION AID	PRE-CHLORINATION	POST-CHLORINATION
			ALUM DRY	ACTIVATED CARBON POWDER	POLYELECTROLYTE	CHLORINE	CHLORINE
DATE	RETENTION TIME(HRS)	FLOW (1000M3)					
JAN 05	45.0	.4	5.00	7.50	.19	1.50	1.00
FEB 02	49.5	.3	7.50	5.00	.20	1.50	1.00
MAR 08	51.3	.3	5.00	5.00	.20	1.50	1.00
APR 06	44.2	.3	5.00	5.00	.20	1.50	1.00
MAY 03	46.2	.3	5.00	5.00	.20	1.50	1.00
JUN 07	27.5	.5	5.00	5.00	.20	1.50	1.00
JUN 23	31.2	.6	5.00	5.00	.20	1.50	1.00
JUL 05	23.7	.8	5.00	5.00	.20	1.50	1.00
AUG 03	27.1	.7	5.00	5.00	.20	1.50	1.00
SEP 07	45.0	.4	10.00	5.00	.20	1.00	1.00
OCT 04	42.5	.4	7.00	5.00	.20	1.00	1.00
NOV 08	50.4	.3	7.50	5.00	.20	1.00	1.00
NOV 28	.	.5	7.50	5.00	.20	1.00	1.00
DEC 06	44.1	.4	7.50	5.00	.20	1.00	1.00
DEC 20	.	.4	7.50	5.00	.20	1.00	1.00

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW TOTAL	RAW POSITIVE	RAW TRACE	TREATED TOTAL	TREATED POSITIVE	TREATED TRACE
BACTERIOLOGICAL	AEROMONAS SP	.	.	.	0	0	0
	E. COLI P/A	.	.	.	0	0	0
	FECAL COLIFORM MF	14	14	0	.	.	.
	FECAL COLIFORM	.	.	.	0	0	0
	STANDRD PLATE CNT MF	3	3	0	11	4	0
	P/A BOTTLE	.	.	.	8	0	0
	STAPH AUREUS	.	.	.	0	0	0
	COLIFORM	.	.	.	0	0	0
	TOTAL COLIFORM MF	14	14	0	14	0	0
	T COLIFORM BCKGRD MF	14	14	0	14	3	0
*TOTAL SCAN BACTERIOLOGICAL		45	45	0	47	7	0
*TOTAL GROUP BACTERIOLOGICAL		45	45	0	47	7	0
CHEMISTRY (FLD)	FLD CHLORINE (COMB)	.	.	.	13	13	0
	FLD CHLORINE FREE	.	.	.	15	15	0
	FLD CHLORINE (TOTAL)	.	.	.	15	15	0
	FLD PH	15	15	0	15	15	0
	FLD TEMPERATURE	15	15	0	15	15	0
	FLD TURBIDITY	15	15	0	15	15	0
*TOTAL SCAN CHEMISTRY (FLD)		45	45	0	88	88	0
CHEMISTRY (LAB)	ALKALINITY	15	15	0	15	15	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
CHEMISTRY (LAB)	CALCIUM	15	15	0	15	15	0
	CYANIDE	15	0	0	15	0	1
	CHLORIDE	15	15	0	15	15	0
	COLOUR	15	0	15	15	0	7
	CONDUCTIVITY	15	15	0	15	15	0
	FLUORIDE	15	13	2	15	14	1
	HARDNESS	15	15	0	15	15	0
	IONCAL	15	7	0	15	7	0
	LANGELIERS INDEX	15	15	0	9	9	0
	MAGNESIUM	15	15	0	15	15	0
	SODIUM	15	15	0	15	15	0
	AMMONIUM TOTAL	15	14	1	15	7	5
	NITRITE	15	6	9	15	1	6
	TOTAL NITRATES	15	15	0	15	15	0
	NITROGEN TOT KJELD	15	14	1	15	9	6
	PH	15	15	0	15	15	0
	PHOSPHORUS FIL REACT	15	3	12	15	1	13
	PHOSPHORUS TOTAL	15	2	13	15	0	3
	TOTAL SOLIDS	1	1	0	1	1	0
	SULPHATE	7	7	0	7	7	0
	TURBIDITY	15	15	0	15	11	4
*TOTAL SCAN CHEMISTRY (LAB)		308	232	53	302	202	46
METALS	SILVER	15	0	7	15	0	9

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
METALS	ALUMINUM	15	15	0	15	15	0
	ARSENIC	15	0	15	15	0	15
	BARIUM	15	15	0	15	15	0
	BORON	15	6	9	15	5	10
	BERYLLIUM	15	0	6	15	0	10
	CADMIUM	15	0	9	15	0	10
	COBALT	15	0	14	15	0	13
	CHROMIUM	15	8	7	15	8	7
	COPPER	15	9	6	15	15	0
	IRON	15	10	5	15	0	10
	MERCURY	14	5	4	14	5	4
	MANGANESE	15	15	0	15	15	0
	MOLYBDENUM	15	3	12	15	7	8
	NICKEL	15	0	11	15	0	12
	LEAD	15	14	1	15	10	5
	ANTIMONY	15	8	7	15	8	7
	SELENIUM	15	0	11	15	1	14
	STRONTIUM	15	15	0	15	15	0
	TITANIUM	15	15	0	15	11	4
	THALLIUM	15	0	5	15	0	7
	URANIUM	15	10	5	15	1	14
	VANADIUM	15	1	14	15	0	15
	ZINC	15	15	0	15	15	0
*TOTAL SCAN METALS		359	164	148	359	146	174
*TOTAL GROUP INORGANIC & PHYSICAL		712	441	201	749	436	220

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
CHLOROAROMATICS	HEXACHLOROBUTADIENE	14	0	0	14	0	0
	123 TRICHLOROBENZENE	14	0	0	14	0	0
	1234 T-CHLOROBENZENE	14	0	0	14	0	0
	1235 T-CHLOROBENZENE	14	0	0	14	0	0
	124 TRICHLOROBENZENE	14	0	0	14	0	0
	1245 T-CHLOROBENZENE	14	0	0	14	0	0
	135 TRICHLOROBENZENE	14	0	0	14	0	0
	HCB	14	0	0	14	0	0
	HEXACHLOROETHANE	14	0	0	14	0	0
	OCTACHLOROSTYRENE	14	0	0	14	0	0
	PENTACHLOROBENZENE	14	0	0	14	0	0
	236 TRICHLOROTOLUENE	14	0	0	14	0	0
	245 TRICHLOROTOLUENE	14	0	0	14	0	0
	26A TRICHLOROTOLUENE	14	0	0	14	0	0
*TOTAL SCAN CHLOROAROMATICS		196	0	0	196	0	0
CHLOROPHENOLS	234 TRICHLOROPHENOL	2	0	0	1	0	0
	2345 T-CHLOROPHENOL	2	0	0	1	0	0
	2356 T-CHLOROPHENOL	2	0	0	1	0	0
	245-TRICHLOROPHENOL	2	0	0	1	0	0
	246-TRICHLOROPHENOL	2	0	0	1	0	1
	PENTACHLOROPHENOL	2	0	0	1	0	0
*TOTAL SCAN CHLOROPHENOLS		12	0	0	6	0	1

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PAH	PHENANTHRENE	15	0	0	14	0	0
	ANTHRACENE	15	0	0	14	0	0
	FLUORANTHENE	15	0	0	14	0	0
	PYRENE	15	0	0	14	0	0
	BENZO(A)ANTHRACENE	15	0	0	14	0	0
	CHRYSENE	15	0	0	14	0	0
	DIMETH. BENZ(A)ANTHR	15	0	0	14	0	0
	BENZO(E) PYRENE	15	0	0	14	0	0
	BENZO(J) FLUORANTHEN	0	0	0	0	0	0
	BENZO(B) FLUORANTHEN	15	0	0	14	0	0
	PERYLENE	15	0	0	14	0	0
	BENZO(K) FLUORANTHEN	15	0	0	14	0	0
	BENZO(A) PYRENE	15	0	0	14	0	0
	BENZO(G,H,I) PERYLEN	15	0	0	14	0	0
	DIBENZO(A,H) ANTHRAC	15	0	0	14	0	0
	INDENO(1,2,3-C,D) PY	15	0	0	14	0	0
	BENZO(B) CHRYSENE	15	0	0	14	0	0
	ANTHANTHRENE	0	0	0	0	0	0
	CORONENE	15	0	0	14	0	0
*TOTAL SCAN PAH		255	0	0	238	0	0
PESTICIDES & PCB	ALDRIN	14	0	0	14	0	0
	ALPHA BHC	14	0	9	14	0	9

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE

SUMMARY TABLE OF RESULTS (1968)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PESTICIDES & PCB	BETA BHC	14	0	0	14	0	0
	LINDANE	14	0	1	14	0	1
	ALPHA CHLORDANE	14	0	0	14	0	0
	GAMMA CHLORDANE	14	0	0	14	0	0
	DIELDRIN	14	0	0	14	0	0
	METHOXYCHLOR	14	0	0	14	0	0
	ENDOSULFAN 1	14	0	0	14	0	0
	ENDOSULFAN II	14	0	0	14	0	0
	ENDRIN	14	0	0	14	0	0
	ENDOSULFAN SULPHATE	14	0	0	14	0	0
	HEPTACHLOR EPOXIDE	14	0	0	14	0	0
	HEPTACHLOR	14	0	0	14	0	0
	MIREX	14	0	0	14	0	0
	OXYCHLORDANE	14	0	0	14	0	0
	OPDDT	14	0	0	14	0	0
	PCB	14	0	0	14	0	0
	DDD	14	0	0	14	0	0
	PPDDE	14	0	0	14	0	0
	PPDDT	14	0	0	14	0	0
	AMETRINE	15	0	0	15	0	0
	ATRAZINE	15	0	0	15	0	0
	ATRATONE	15	0	0	15	0	0
	CYANAZINE	15	0	0	15	0	0
	DES ETHYL ATRAZINE	8	0	0	8	0	0
	DES ETHYL SIMAZINE	8	0	0	8	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PESTICIDES & PCB	PROMETONE	15	0	0	15	0	0
	PROPAZINE	15	0	0	15	0	0
	PROMETRYNE	15	0	0	15	0	0
	METRIBUZIN	15	0	0	15	0	0
	SIMAZINE	15	0	0	15	0	0
	ALACHLOR	15	0	0	15	0	0
	METOLACHLOR	15	0	0	15	0	0
*TOTAL SCAN PESTICIDES & PCB		475	0	10	475	0	10
PHENOLICS	PHENOLICS	15	2	10	15	2	8
*TOTAL SCAN PHENOLICS		15	2	10	15	2	8
SPECIFIC PESTICIDES	TOXAPHENE	0	0	0	0	0	0
	2,4,5-T	2	0	0	1	0	0
	2,4-D	2	0	0	1	0	0
	2,4-DB	2	0	0	1	0	0
	2,4 D PROPIONIC ACID	2	0	0	1	0	0
	DICAMBA	2	0	0	1	0	0
	PICHLORAM	0	0	0	0	0	0
	SILVEX	2	0	0	1	0	0
	DIAZINON	2	0	0	2	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
SPECIFIC PESTICIDES	DICHLOROVOS	2	0	0	2	0	0
	CHLORPYRIFOS	2	0	0	2	0	0
	ETHION	2	0	0	2	0	0
	AZINPHOS-METHYL	0	0	0	0	0	0
	MALATHION	2	0	0	2	0	0
	MEVINPHOS	2	0	0	2	0	0
	METHYL PARATHION	2	0	0	2	0	0
	METHYLTRITHION	2	0	0	2	0	0
	PARATHION	2	0	0	2	0	0
	PHORATE	2	0	0	2	0	0
	RELDAN	2	0	0	2	0	0
	RONNEL	2	0	0	2	0	0
	AMINOCARB	0	0	0	0	0	0
	BENOMYL	2	0	0	2	0	0
	BUX	2	0	0	2	0	0
	CARBOFURAN	2	0	0	2	0	0
	CICP	2	0	0	2	0	0
	DIALLATE	2	0	0	2	0	0
	EPTAM	2	0	0	2	0	0
	IPC	2	0	0	2	0	0
	PROPOXUR	2	0	0	2	0	0
	CARBARYL	2	0	0	2	0	0
	BUTYLATE	2	0	0	2	0	0
*TOTAL SCAN SPECIFIC PESTICIDES		56	0	0	50	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
VOLATILES	BENZENE	12	0	5	12	1	9
	TOLUENE	12	0	5	12	0	8
	ETHYLBENZENE	12	0	6	12	0	9
	P-XYLENE	12	0	0	12	1	0
	M-XYLENE	12	0	2	12	0	6
	O-XYLENE	12	0	2	12	0	7
	STYRENE	5	1	3	5	0	0
	1,1 DICHLOROETHYLENE	12	0	0	12	0	0
	METHYLENE CHLORIDE	12	0	0	12	0	0
	T1,2DICHLOROETHYLENE	12	0	0	12	0	0
	1,1 DICHLOROETHANE	12	0	0	12	0	0
	CHLOROFORM	12	1	3	12	12	0
	111, TRICHLOROETHANE	12	0	0	12	0	0
	1,2 DICHLOROETHANE	12	0	0	12	0	1
	CARBON TETRACHLORIDE	12	0	0	12	0	0
	1,2 DICHLOROPROPANE	12	0	0	12	0	0
	TRICHLOROETHYLENE	12	0	0	12	0	0
	DICHLOROBROMOMETHANE	12	0	3	12	12	0
	112 TRICHLOROETHANE	12	0	0	12	0	0
	CHLORODIBROMOMETHANE	12	0	1	12	12	0
	T-CHLOROETHYLENE	12	0	2	12	0	2
	BROMOFORM	12	0	0	12	0	12
	1122 T-CHLOROETHANE	12	0	0	12	0	0
	CHLOROBENZENE	12	0	0	12	0	0
	1,4 DICHLOROBENZENE	12	0	0	12	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
VOLATILES	1,3 DICHLOROBENZENE	12	0	0	12	0	0
	1,2 DICHLOROBENZENE	12	0	0	12	0	0
	TRIFLUOROCHLOROTOLUE	3	0	0	3	0	0
	ETHLYENE DIBROMIDE	12	0	0	12	0	0
	TOTL TRIHALOMETHANES	12	0	3	12	12	0
*TOTAL SCAN VOLATILES		344	2	35	344	50	54
*TOTAL GROUP ORGANIC		1353	4	55	1324	52	73
TOTAL		2110	490	256	2120	495	293

KEY TO TABLE 5 and 6

A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
1+. MAC for Total Trihalomethanes
1*. MAC for Bacteriological Analyses
Poor water quality is indicated when :
- total coliform counts > 0 < 5
- P/A Bottle Test is present after 48 hours
- Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
- Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
- Standard Plate Count should not exceed 500 organisms per ml at 35 ^{0}C within 48 hours

2. Interim Maximum Acceptable Concentration (IMAC)
3. Maximum Desirable Concentration (MDC)
4. Aesthetic or Recommended Operational Guideline
- hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness >200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.

B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC
4. Aesthetic Objective (AO) (for xylenes, the AO is a total)

C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria

F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissable Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

H USSR MAXIMUM PERMISSIBLE CONCENTRATION

I NEW YORK STATE AMBIENT WATER GUIDELINE

N/A NONE AVAILABLE

INTERPRETATION OF DATA

The interpretation of analytical results that are obtained from measurements near the limit of detection of the measurement process is subject to greater uncertainty than those at higher concentrations. The principle areas of concern relate to whether the substance has actually been detected, whether it has been properly identified, and whether it is an artifact of the measurement process. In other words, false positives can be caused by the instrumentation or the test procedures used, when in fact these compounds are not present in the sample.

There are several methods to treat data from such measurements:
1. Exclude the low-level data because of this uncertainty factor. However, studies of long-term environmental trends and modelling may be adversely affected by exclusion of such data.
2. Qualify these data so the user is aware of the greater uncertainty associated with their use.

For the Drinking Water Surveillance Program, measurements near the limit of detection of the measurement process are reported qualified by the code "<T". Results quantified by "W" indicate a zero measurement. These results are reported for purposes of modelling and long-term trend analysis and no significance should be attributed to a single determination of a substance below "T" (a single determination may well be a false positive). Repeat analysis or additional data are needed before it can be stated with certainty that the substance in question was truly present. On the other hand, it is less likely that repeated detection of a substance at or near the limit of detection at a specific location is solely due to an artifact in the measurement system, and more likely represents a true positive. However the average of such data is still only an estimate of the amount of substance present subject to the possible biases of the method used.

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurable Amount
<T	Greater Than Detection Limit But Not Confident (SEE INTERPRETATION OF RESULTS ABOVE)
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!AW	No Data: Analysis Withdrawn
!CR	No Data: Could Not Confirm By Reanalysis
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!LA	No Data: Laboratory Accident

!LD	No Data: Test Queued After Sample Discarded
!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!QU	No Data: Quality Control Unacceptable
!PE	No Data: Procedural Error - Sample Discarded
!PH	No Data: Sample pH Outside Valid Range
!RE	No Data: Received Empty
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
!TX	No Data: Time Expired
A3C	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRO	Calculated Result Only
PPS	Test Performed On Preserved Sample
RMP	P and M-Xylene Not Separated
RRV	Rerun Verification
RVU	Reported Value Unusual
SPS	Several Peaks, Small, Not Priority Pollutant
UAL	Unreliable: Sample Age Exceeds Normal Limit
UCR	Unreliable: Could Not Confirm By Reanalysis
UCS	Unreliable: Contamination Suspected
UIN	Unreliable: Indeterminant Interference
XP	Positive After X Number of Hours
T# (T06)	Result Taken After # Hours

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED		
BACTERIOLOGICAL				
FECAL COLIFORM MF (CT/100ML)			DET'N LIMIT = 0	GUIDELINE = 0 (A1)
JAN	295	.		
FEB	124	.		
MAR	103	.		
APR	208	.		
MAY	112	.		
JUN	4	.		
	ILA	.		
JUL	6	.		
AUG	156	.		
SEP	68	.		
OCT	95	.		
NOV	150 >	.		
	160 T48	.		
DEC	304	.		
	312 T24	.		
STANDRD PLATE CNT MF (CT/ML)			DET'N LIMIT = 0	GUIDELINE = 500/ML (A1)
JAN	320	1		
FEB	IAW	0		
MAR	600	2		
APR	IOP	0		
MAY	IOP	8		
JUN	1700	0		
	ILA	ILA		
JUL	IAW	IAW		
AUG	IAW	IAW		
SEP	.	IAW		
OCT	.	1 <=>		
NOV	.	0 <=>		
	.	28 T48		
DEC	.	0 <=>		
	.	1 <=>		
P/A BOTTLE ( )			DET'N LIMIT = 0	GUIDELINE = 0 (A1*)
JAN	.	0		
FEB	.	0		
MAR	.	0		
APR	.	0		
MAY	.	0		
JUN	.	0		
	.	ILA		
JUL	.	0		
AUG	.	0		
TOTAL COLIFORM MF (CT/100ML)			DET'N LIMIT = 0	GUIDELINE = 5/100ML(A1)
JAN	2900	0		

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
FEB	2400	0	
MAR	4600	0	
APR	37 A3C	0	
MAY	3800	0	
JUN	46	0	
	ILA	ILA	
JUL	18 A3C	0	
AUG	2500	0	
SEP	3100	0	
OCT	1080 A3C	0 T48	
NOV	3000 >	0 T24	
	2900 T48	0 T48	
DEC	6400	0 T48	
	3000 T24	0 T24	

T COLIFORM BCKGRD MF (CT/100ML) DET'N LIMIT = 0 GUIDELINE = N/A

JAN	5700	0
FEB	11200	0
MAR	5300	0
APR	300 >	0
MAY	10000	0
JUN	420	1
	ILA	ILA
JUL	16000	0
AUG	24000	12
SEP	5900	0
OCT	8200 A3C	0 T48
NOV	3000 >	1 T24
	4700 T48	0 T48
DEC	17000	0 T48
	7200 T24	0 T24

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
CHEMISTRY (FLD)			
FLD CHLORINE (COMB) ( )		DET'N LIMIT = N/A	GUIDELINE = N/A
JAN	.	.100	
FEB	.	.100	
MAR	.	.200	
APR	.	.300	
MAY	.	.100	
JUN	.	.100	
JUL	.	.200	
AUG	.	.200	
SEP	.	.010	
NOV	.	.200	
	.	.300	
DEC	.	.200	
	.	.300	
FLD CHLORINE FREE ( )		DET'N LIMIT = N/A	GUIDELINE = N/A
JAN	.	.900	
FEB	.	.900	
MAR	.	.800	
APR	.	.800	
MAY	.	.900	
JUN	.	1.000	
	.	.400	
JUL	.	.600	
AUG	.	.700	
SEP	.	.800	
OCT	.	1.000	
NOV	.	.800	
	.	1.100	
DEC	.	.900	
	.	1.200	
FLD CHLORINE (TOTAL) ( )		DET'N LIMIT = N/A	GUIDELINE = N/A
JAN	.	1.000	
FEB	.	1.000	
MAR	.	1.000	
APR	.	1.100	
MAY	.	1.000	
JUN	.	1.100	
	.	.600	
JUL	.	.800	
AUG	.	.900	
SEP	.	.800	
OCT	.	1.100	
NOV	.	1.000	
	.	1.400	
DEC	.	1.100	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED		
DEC	.	1.500		
FLD PH (DIMNSLESS)			DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5(A4)
JAN	7.800	7.100		
FEB	8.200	7.600		
MAR	8.200	7.600		
APR	8.200	7.500		
MAY	8.200	7.500		
JUN	8.000	7.600		
	8.200	7.600		
JUL	8.200	7.500		
AUG	8.500	7.600		
SEP	8.000	7.600		
OCT	8.400	7.600		
NOV	8.400	7.600		
	7.900	7.500		
DEC	8.400	7.500		
	7.500	7.700		
FLD TEMPERATURE (DEG.C)			DET'N LIMIT = N/A	GUIDELINE = 15 (A1)
JAN	2.000	2.700		
FEB	1.500	2.000		
MAR	1.000	2.000		
APR	4.500	5.500		
MAY	6.500	7.000		
JUN	14.500	15.200		
	16.700	17.500		
JUL	18.500	19.500		
AUG	23.500	23.700		
SEP	19.000	21.000		
OCT	16.000	17.200		
NOV	9.000	10.000		
	7.000	8.000		
DEC	5.700	7.000		
	4.000	3.000		
FLD TURBIDITY (FTU)			DET'N LIMIT = N/A	GUIDELINE = 1.0 (A1)
JAN	3.600	.110		
FEB	2.300	.060		
MAR	1.700	1.700		
APR	3.800	.120		
MAY	3.400	.090		
JUN	2.800	2.500		
	2.500	.100		
JUL	2.800	.080		
AUG	2.800	.900		
SEP	21.000	.100		

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
OCT	5.400	.800	
NOV	4.600	.050	
	2.100	.260	
DEC	12.400	6.800	
	2.700	.120	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
CHEMISTRY (LAB)			
ALKALINITY (MG/L)			DET'N LIMIT = .200 GUIDELINE = 30-500 (A4)
JAN	83.700	77.800	
FEB	82.600	74.700	
MAR	87.000	80.000	
APR	86.400	79.400	
MAY	86.500	80.100	
JUN	86.900	80.200	
	86.100	82.000	
JUL	87.200	82.900	
AUG	88.100	81.800	
SEP	84.300	77.700	
OCT	86.300	81.600	
NOV	85.000	76.800	
	86.000	79.000	
DEC	84.100	78.100	
	85.000	76.800	
CALCIUM (MG/L)			DET'N LIMIT = .100 GUIDELINE = 100 (F2)
JAN	28.000	28.400	
FEB	27.600	28.800	
MAR	28.800	29.800	
APR	27.200	28.000	
MAY	28.200	29.200	
JUN	28.600	28.900	
	29.500	29.900	
JUL	29.600	29.000	
AUG	29.800	30.200	
SEP	28.400	30.600	
OCT	28.800	31.600	
NOV	28.600	29.200	
	27.400	28.000	
DEC	30.400	30.200	
	28.400	30.000	
CYANIDE (MG/L)			DET'N LIMIT = 0.001 GUIDELINE = .200 (A1)
JAN	BDL	BDL	
FEB	BDL	.003 <T	
MAR	BDL	BDL	
APR	BDL	BDL	
MAY	BDL	BDL	
JUN	BDL	BDL	
	BDL	BDL	
JUL	BDL	BDL	
AUG	BDL	BDL	
SEP	BDL	BDL	
OCT	BDL	BDL	
NOV	BDL	BDL	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
NOV	BDL	BDL	
DEC	BDL	BDL	
	BDL	BDL	
CHLORIDE (MG/L)		DET'N LIMIT = .200	GUIDELINE = 250 (A3)
JAN	9.600	10.200	
FEB	8.500	10.500	
MAR	10.600	10.900	
APR	8.200	9.900	
MAY	9.000	10.000	
JUN	9.100	9.800	
	9.200	9.500	
JUL	9.100	9.400	
AUG	8.600	9.100	
SEP	9.100	9.800	
OCT	8.400	9.200	
NOV	10.600	10.700	
	9.500	10.300	
DEC	9.300	10.100	
	10.600	10.300	
COLOUR (HZU)		DET'N LIMIT = .5	GUIDELINE = 5.0 (A3)
JAN	1.000 <T	.500 <T	
FEB	.500 <T	BDL	
MAR	1.500 <T	.500 <T	
APR	1.500 <T	.500 <T	
MAY	1.000 <T	.500 <T	
JUN	2.000 <T	1.500 <T	
	1.000 <T	.500 <T	
JUL	1.000 <T	.500 <T	
AUG	1.000 <T	BDL	
SEP	.500 <T	BDL	
OCT	1.000 <T	BDL	
NOV	.500 <T	BDL	
	.500 <T	BDL	
DEC	.500 <T	BDL	
	1.000 <T	BDL	
CONDUCTIVITY (UMHO/CM)		DET'N LIMIT = 1	GUIDELINE = 400 (F2)
JAN	234	240	
FEB	223	238	
MAR	238	239	
APR	224	232	
MAY	235	244	
JUN	233	240	
	229	234	
JUL	234	239	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
AUG	236	238	
SEP	231	238	
OCT	229	236	
NOV	234	240	
	232	240	
DEC	226	234	
	234	236	
FLUORIDE (MG/L)		DET'N LIMIT = .01	GUIDELINE = 2.400 (A1)
JAN	.040 <T	.040 <T	
FEB	.060	.060	
MAR	.070	.060	
APR	.080	.060	
MAY	.090	.070	
JUN	.090	.070	
	.090	.090	
JUL	.090	.090	
AUG	.080	.070	
SEP	.040 <T	.060	
OCT	.080	.080	
NOV	.100	.080	
	.080	.080	
DEC	.080	.060	
	.080	.080	
HARDNESS (MG/L)		DET'N LIMIT = .500	GUIDELINE = 80-100 (A4)
JAN	100.000	101.000	
FEB	96.000	97.000	
MAR	103.000	105.000	
APR	99.000	102.000	
MAY	100.000	104.000	
JUN	101.000	102.000	
	106.000	108.000	
JUL	104.000	103.000	
AUG	104.000	105.800	
SEP	102.000	106.000	
OCT	102.000	109.000	
NOV	101.000	103.000	
	99.000	101.000	
DEC	107.000	108.000	
	102.000	106.000	
IONICAL (DIMNSLESS)		DET'N LIMIT = N/A	GUIDELINE = N/A
JAN	.000 NAF	.000 NAF	
FEB	.000 NAF	.000 NAF	
MAR	.000 NAF	.000 NAF	
APR	.000 NAF	.000 NAF	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1-88

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
MAY	.000 MAF	.000 MAF	
JUN	.000 MAF	.000 MAF	
	.000 MAF	.000 MAF	
JUL	.000 MAF	.000 MAF	
AUG	1.905	1.017	
SEP	.515	2.853	
OCT	2.550	3.279	
NOV	2.280	1.726	
	5.186	5.858	
DEC	3.273	.786	
	2.254	.965	
LANGELIERS INDEX (DIMENSLESS)		DET'N LIMIT = N/A	GUIDELINE = N/A
JAN	.207 MAF	-.001 MAF	
FEB	.099 MAF	-.152 MAF	
MAR	.114 MAF	-.108 MAF	
APR	.182 MAF	.054 MAF	
MAY	.184 MAF	.152 MAF	
JUN	.302 MAF	.199 MAF	
	.173 MAF	.004 MAF	
JUL	.188 MAF	-.014 MAF	
AUG	.295	.168	
SEP	.067	.041	
OCT	.254	.257	
NOV	.192	-.135	
	.130	.039	
DEC	.217	.189	
	.089	-.182	
MAGNESIUM (MG/L)		DET'N LIMIT = .050	GUIDELINE = 30 (F2)
JAN	7.300	7.400	
FEB	6.500	6.000	
MAR	7.500	7.500	
APR	7.600	7.700	
MAY	7.300	7.400	
JUN	7.150	7.100	
	7.930	7.980	
JUL	7.200	7.500	
AUG	7.200	7.400	
SEP	7.400	7.400	
OCT	7.300	7.400	
NOV	7.100	7.200	
	7.500	7.500	
DEC	7.600	7.900	
	7.700	7.500	
SODIUM (MG/L)		DET'N LIMIT = .200	GUIDELINE = 200 (C3)
JAN	6.200	6.200	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
FEB	4.600	6.400	
MAR	6.600	6.400	
APR	5.800	6.200	
MAY	6.000	6.400	
JUN	6.000	6.300	
	5.690	5.650	
JUL	5.400	5.400	
AUG	5.800	5.400	
SEP	6.000	6.000	
OCT	5.200	6.200	
NOV	6.600	6.200	
	5.600	5.400	
DEC	5.800	6.000	
	6.800	6.000	
AMMONIUM TOTAL (MG/L)		DET'N LIMIT = 0.002	GUIDELINE = .05 (F2)
JAN	.024	.004 <T	
FEB	.016	BDL	
MAR	.008 <T	BDL	
APR	.022	.010	
MAY	.016	BDL	
JUN	.022	.004 <T	
	.026	.010	
JUL	.016	.006 <T	
AUG	.024	.024	
SEP	.018	.002 <T	
OCT	.026	.010	
NOV	.012	.002 <T	
	.018	.010	
DEC	.016	.010	
	.028	.018	
NITRITE (MG/L)		DET'N LIMIT = 0.001	GUIDELINE = 1.000 (A1)
JAN	.003 <T	BDL	
FEB	.002 <T	BDL	
MAR	.002 <T	BDL	
APR	.015	.001 <T	
MAY	.003 <T	BDL	
JUN	.003 <T	BDL	
	.005	.001 <T	
JUL	.004 <T	.001 <T	
AUG	.002 <T	.004 <T	
SEP	.006	.001 <T	
OCT	.010	.001 <T	
NOV	.005	BDL	
	.002 <T	BDL	
DEC	.003 <T	BDL	
	.004	.001	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
TOTAL NITRATES (MG/L)			DET'N LIMIT = .020 GUIDELINE = 10.000 (A1)
JAN	.290	.280	
FEB	.405	.355	
MAR	.335	.340	
APR	.360	.350	
MAY	.330	.335	
JUN	.290	.290	
	.290	.290	
JUL	.275	.290	
AUG	.255	.280	
SEP	.245	.250	
OCT	.265	.250	
NOV	.340	.320	
	.305	.315	
DEC	.300	.305	
	.295	.310	
NITROGEN TOT KJELD (MG/L)			DET'N LIMIT = .020 GUIDELINE = N/A
JAN	.275	.090 <T	
FEB	.150	.120	
MAR	.030 <T	.060 <T	
APR	.260	.120	
MAY	.100	.070 <T	
JUN	.190	.120	
	.180	.100	
JUL	.180	.120	
AUG	.180	.130	
SEP	.210	.100	
OCT	.160	.080 <T	
NOV	.140	.100	
	.140	.080 <T	
DEC	.190	.090 <T	
	.180	.110	
PH (DIMNSLESS)			DET'N LIMIT = N/A GUIDELINE = 6.5-8.5(A4)
JAN	8.250	8.070	
FEB	8.150	7.930	
MAR	8.130	7.930	
APR	8.220	8.120	
MAY	8.210	8.200	
JUN	8.320	8.250	
	8.180	8.020	
JUL	8.190	8.020	
AUG	8.290	8.190	
SEP	8.100	8.080	
OCT	8.270	8.260	
NOV	8.220	7.930	
	8.170	8.110	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
DEC	8.220	8.230	
	8.120	7.870	
PHOSPHORUS FIL REACT (MG/L)		DET'N LIMIT = .0005	GUIDELINE = N/A
JAN	.001 <T	.000 <T	
FEB	.001 <T	BDL	
MAR	.001 <T	.000 <T	
APR	.001 <T	.000 <T	
MAY	.000 <T	.000 <T	
JUN	.000 <T	.000 <T	
	.001 <T	.000 <T	
JUL	.000 <T	.000 <T	
AUG	.000 <T	.002 <T	
SEP	.002	.000 <T	
OCT	.001 <T	.001 <T	
NOV	.000 <T	.000 <T	
	.001 <T	.001 <T	
DEC	.002	.001 <T	
	.041	.001	
PHOSPHORUS TOTAL (MG/L)		DET'N LIMIT = .002	GUIDELINE = .40 (F2)
JAN	.007 <T	BDL	
FEB	.007 <T	BDL	
MAR	.004 <T	BDL	
APR	.006 <T	BDL	
MAY	.002 <T	BDL	
JUN	.004 <T	BDL	
	.010	.004 <T	
JUL	.007 <T	.002 <T	
AUG	.003 <T	BDL	
SEP	.004 <T	BDL	
OCT	.006 <T	.002 <T	
NOV	.002 <T	BDL	
	.003 <T	BDL	
DEC	.009 <T	BDL	
	.045	BDL	
TOTAL SOLIDS (MG/L)		DET'N LIMIT = 1.	GUIDELINE = 500 (A3)
JAN	152 CRO	156 CRO	
SULPHATE ( )		DET'N LIMIT = .200	GUIDELINE = 500. (A3)
AUG	17.040	22.270	
SEP	16.340	23.170	
OCT	16.400	22.500	
NOV	15.770	23.980	
	16.100	23.480	

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DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
DEC	17.000	25.500	
	18.330	26.480	

TURBIDITY (FTU) DET'N LIMIT = .02 GUIDELINE = 1.00 (A1)

JAN	2.800	.110	
FEB	1.360	.100	
MAR	1.080	.080	<T
APR	1.880	.080	<T
MAY	2.500	.120	
JUN	1.000	.090	<T
	2.600	.210	
JUL	1.600	.330	
AUG	1.900	.500	
SEP	14.100	.540	
OCT	3.400	.320	
NOV	1.760	.260	
	2.100	.840	
DEC	9.400	.230	<T
	2.400	.380	

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DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
METALS			
SILVER (UG/L)			DET'N LIMIT = .020 GUIDELINE = 50. (A1)
JAN	.020 <T	BDL	
FEB	BDL	.020 <T	
MAR	.020 <T	.020 <T	
APR	BDL	BDL	
MAY	BDL	BDL	
JUN	BDL	BDL	
	.040 <T	.050 <T	
JUL	.030 <T	BDL	
AUG	.070 <T	.040 <T	
SEP	BDL	.130 <T	
OCT	BDL	.100 <T	
NOV	BDL	.160 <T	
	.060 <T	.200 <T	
DEC	BDL	BDL	
	.030 <T	.100 <T	
ALUMINUM (UG/L)			DET'N LIMIT = .050 GUIDELINE = 100.(A4)
JAN	45.240	48.720	
FEB	26.680	33.640	
MAR	17.400	44.080	
APR	33.640	46.400	
MAY	35.960	46.400	
JUN	25.520	116.000	
	46.400	220.400	
JUL	39.440	243.600	
AUG	41.760	301.600	
SEP	127.600	185.600	
OCT	52.200	139.200	
NOV	35.960	44.080	
	34.800	44.080	
DEC	61.480	37.120	
	37.120	35.960	
ARSENIC (UG/L)			DET'N LIMIT = 0.050 GUIDELINE = 50.0 (A1)
JAN	.670 <T	.330 <T	
FEB	.600 <T	.330 <T	
MAR	.460 <T	.260 <T	
APR	.350 <T	.110 <T	
MAY	.360 <T	.260 <T	
JUN	.320 <T	.220 <T	
	.460 <T	.350 <T	
JUL	.920 <T	.330 <T	
AUG	.610 <T	.310 <T	
SEP	.660 <T	.320 <T	
OCT	1.000 <T	.570 <T	
NOV	.440 <T	.310 <T	

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DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
NOV	.600 <T	.250 <T	
DEC	.680 <T	.550 <T	
	.860 <T	.250 <T	
BARIUM (UG/L)			DET'N LIMIT = 0.020 GUIDELINE = 1000. (A1)
JAN	16.000	16.000	
FEB	15.000	16.000	
MAR	15.000	14.000	
APR	15.000	14.000	
MAY	16.000	16.000	
JUN	15.000	15.000	
	14.000	15.000	
JUL	16.000	17.000	
AUG	16.000	18.000	
SEP	19.000	17.000	
OCT	16.000	14.000	
NOV	14.000	15.000	
	14.000	14.000	
DEC	15.000	13.000	
	15.000	14.000	
BORON (UG/L)			DET'N LIMIT = 0.200 GUIDELINE = 5000. (A1)
JAN	14.000 <T	16.000 <T	
FEB	12.000 <T	13.000 <T	
MAR	13.000 <T	13.000 <T	
APR	13.000 <T	13.000 <T	
MAY	12.000 <T	12.000 <T	
JUN	18.000 <T	13.000 <T	
	18.000 <T	18.000 <T	
JUL	51.000	16.000 <T	
AUG	15.000 <T	33.000	
SEP	16.000 <T	14.000 <T	
OCT	32.000	30.000	
NOV	35.000	43.000	
	60.000	54.000	
DEC	24.000	15.000 <T	
	40.000	40.000	
BERYLLIUM (UG/L)			DET'N LIMIT = 0.010 GUIDELINE = .20 (H)
JAN	BDL	BDL	
FEB	BDL	BDL	
MAR	BDL	.010 <T	
APR	BDL	.030 <T	
MAY	BDL	BDL	
JUN	BDL	BDL	
	.040 <T	.020 <T	
JUL	.070 <T	.060 <T	

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DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
AUG	.050 <T	.110 <T	
SEP	BDL	.020 <T	
OCT	BDL	.020 <T	
NOV	.080 <T	.030 <T	
	.140 <T	.100 <T	
DEC	BDL	BDL	
	.070 <T	.130 <T	
CADMIUM (UG/L)			DET'N LIMIT = 0.050 GUIDELINE = 5.000 (A1)
JAN	.150 <T	.190 <T	
FEB	.140 <T	.190 <T	
MAR	.130 <T	.150 <T	
APR	.120 <T	.190 <T	
MAY	.100 <T	.090 <T	
JUN	.090 <T	.130 <T	
	BDL	.220 <T	
JUL	.140 <T	.110 <T	
AUG	.090 <T	.070 <T	
SEP	.060 <T	.120 <T	
OCT	BDL	BDL	
NOV	BDL	BDL	
	BDL	BDL	
DEC	BDL	BDL	
	BDL	BDL	
COBALT (UG/L)			DET'N LIMIT = 0.020 GUIDELINE = 1000 (H)
JAN	.150 <T	.110 <T	
FEB	.080 <T	.080 <T	
MAR	.020 <T	.050 <T	
APR	.160 <T	.090 <T	
MAY	.120 <T	.070 <T	
JUN	.090 <T	.050 <T	
	BDL	BDL	
JUL	.190 <T	.140 <T	
AUG	.100 <T	.110 <T	
SEP	.310 <T	.090 <T	
OCT	.160 <T	.130 <T	
NOV	.050 <T	BDL	
	.090 <T	.090 <T	
DEC	.290 <T	.180 <T	
	.180 <T	.150 <T	
CHROMIUM (UG/L)			DET'N LIMIT = 0.100 GUIDELINE = 50. (A1)
JAN	.540 <T	.420 <T	
FEB	.480 <T	.510 <T	
MAR	.470 <T	.410 <T	
APR	.540 <T	.510 <T	

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DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
MAY	.530 <T	.430 <T	
JUN	3.700	1.400	
	4.000	3.500	
JUL	5.600	4.000	
AUG	.640 <T	2.200	
SEP	.970 <T	.590 <T	
OCT	5.300	5.000	
NOV	3.400	5.300	
	4.700	4.200	
DEC	1.800	.270 <T	
	3.700	4.000	
COPPER (UG/L)		DET'N LIMIT = .100	GUIDELINE = 1000 (A3)
JAN	.880 <T	3.100	
FEB	73.000	3.000	
MAR	18.000	4.800	
APR	.820 <T	2.300	
MAY	15.000	2.300	
JUN	1.100	2.300	
	.760 <T	1.700	
JUL	2.600	2.800	
AUG	1.100	3.400	
SEP	1.100	3.000	
OCT	1.500	2.900	
NOV	.710 <T	2.700	
	.860 <T	2.600	
DEC	1.000 <T	2.700	
	1.200	2.400	
IRON (UG/L)		DET'N LIMIT = 4.000	GUIDELINE = 300. (A3)
JAN	74.000	7.100 <T	
FEB	84.000	12.000 <T	
MAR	30.000 <T	11.000 <T	
APR	53.000	6.200 <T	
MAY	58.000	10.000 <T	
JUN	52.000	9.300 <T	
	38.000 <T	12.000 <T	
JUL	50.000 <T	BDL	
AUG	62.000	6.300 <T	
SEP	240.000	5.400 <T	
OCT	76.000	5.200 <T	
NOV	55.000	BDL	
	28.000 <T	BDL	
DEC	110.000	BDL	
	41.000 <T	BDL	
MERCURY (UG/L)		DET'N LIMIT = 0.010	GUIDELINE = 1.000 (A1)
JAN	.020	.020	

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DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
MANGANESE (UG/L)			DET'N LIMIT = .050 GUIDELINE = 50.0 (A3)
FEB	.020	.020	
MAR	.020	.010	
APR	.020	.010	
MAY	.100	.010	
JUN	.020 <T	.020 <T	
	.030 <T	.030 <T	
JUL	.030 <T	.020 <T	
AUG	ISS	ISS	
SEP	.020 <T	.020 <T	
OCT	BDL	BDL	
NOV	BDL	BDL	
	BDL	BDL	
DEC	BDL	BDL	
	BDL	BDL	
MANGANESE (UG/L)			DET'N LIMIT = .050 GUIDELINE = 50.0 (A3)
JAN	2.800	.880	
FEB	2.600	.910	
MAR	1.600	.770	
APR	2.300	.870	
MAY	2.800	.870	
JUN	2.500	.800	
	2.200	.740	
JUL	2.600	.900	
AUG	2.200	.690	
SEP	8.800	1.000	
OCT	3.500	.710	
NOV	2.200	.700	
	1.700	.620	
DEC	5.800	.740	
	1.900	.540	
MOLYBDENUM (UG/L)			DET'N LIMIT = 0.020 GUIDELINE = 500 (H)
JAN	.500	.530	
FEB	.450 <T	.530	
MAR	.460 <T	.500	
APR	.370 <T	.380 <T	
MAY	.370 <T	.430 <T	
JUN	.420 <T	.390 <T	
	.520	.470 <T	
JUL	.390 <T	.370 <T	
AUG	.310 <T	.290 <T	
SEP	.310 <T	.390 <T	
OCT	.420 <T	.510	
NOV	.440 <T	.590	
	.530	.540	
DEC	.450 <T	.430 <T	
	.490 <T	.580	

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DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
NICKEL (UG/L)			DET'N LIMIT = 0.100 GUIDELINE = 50. (F3)
JAN	.970 <T	.930 <T	
FEB	.360 <T	.380 <T	
MAR	BDL	.360 <T	
APR	.590 <T	.820 <T	
MAY	.770 <T	.780 <T	
JUN	.390 <T	.170 <T	
	.250 <T	.240 <T	
JUL	.800 <T	.510 <T	
AUG	BDL	BDL	
SEP	.460 <T	.590 <T	
OCT	.390 <T	.330 <T	
NOV	BDL	BDL	
	BDL	BDL	
DEC	1.600 <T	.780 <T	
	.370 <T	.520 <T	
LEAD (UG/L)			DET'N LIMIT = 0.050 GUIDELINE = 50. (A1)
JAN	.690	.400	
FEB	3.900	.440	
MAR	1.200	1.600	
APR	.440	.380	
MAY	.970	.360	
JUN	.480	.360	
	.220	.390	
JUL	2.700	.570	
AUG	.450	.630	
SEP	.760	.550	
OCT	.510	.150 <T	
NOV	.270	.090 <T	
	.150 <T	.080 <T	
DEC	.250	.060 <T	
	.440	.100 <T	
ANTIMONY (UG/L)			DET'N LIMIT = .050 GUIDELINE = 146. (D4)
JAN	.140 <T	.140 <T	
FEB	.150 <T	.150 <T	
MAR	.120 <T	.120 <T	
APR	.120 <T	.090 <T	
MAY	.150 <T	.140 <T	
JUN	.120 <T	.120 <T	
	.140 <T	.140 <T	
JUL	.480	.450	
AUG	.470	.460	
SEP	.300	.370	
OCT	.600	.610	
NOV	.460	.630	
	.340	.320	

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DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
DEC	.240	.540	
	.430	.390	
SELENIUM (MG/L)		DET'N LIMIT = 0.200	GUIDELINE = 10. (A1)
JAN	BDL	.001	
FEB	.370 <T	.690 <T	
MAR	BDL	.750 <T	
APR	BDL	.710 <T	
MAY	.440 <T	1.800 <T	
JUN	.660 <T	1.300 <T	
	.810 <T	.410 <T	
JUL	1.100 <T	1.100 <T	
AUG	1.800 <T	2.300 <T	
SEP	1.500 <T	.630 <T	
OCT	.840 <T	3.400 <T	
NOV	BDL	1.600 <T	
	1.800 <T	4.300 <T	
DEC	.900 <T	3.600 <T	
	1.100 <T	.500 <T	
STRONTIUM (UG/L)		DET'N LIMIT = .050	GUIDELINE = 2000.(N)
JAN	100.000	110.000	
FEB	96.000	110.000	
MAR	97.000	100.000	
APR	99.000	100.000	
MAY	100.000	110.000	
JUN	110.000	110.000	
	110.000	110.000	
JUL	100.000	100.000	
AUG	110.000	120.000	
SEP	100.000	110.000	
OCT	110.000	120.000	
NOV	89.000	100.000	
	100.000	99.000	
DEC	97.000	93.000	
	98.000	100.000	
TITANIUM (UG/L)		DET'N LIMIT = .050	GUIDELINE = N/A
JAN	3.400	2.000	
FEB	5.200	4.200	
MAR	5.300	4.800	
APR	5.400	4.700	
MAY	2.800	1.200 <T	
JUN	2.300	1.300 <T	
	3.300	1.400 <T	
JUL	4.300	2.700	
AUG	8.100	7.000	

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DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
THALLIUM (UG/L)			DET'N LIMIT = .010 GUIDELINE = 13. (D4)
SEP	6.800	4.000	
OCT	4.600	2.800	
NOV	2.300	1.300 <T	
	7.500	5.700	
DEC	5.200	2.700	
	5.800	4.800	
JAN	.010 <T	.010 <T	
FEB	.010 <T	.010 <T	
MAR	.020 <T	.030 <T	
APR	BDL	BDL	
MAY	BDL	BDL	
JUN	BDL	BDL	
	BDL	BDL	
JUL	.020 <T	BDL	
AUG	BDL	BDL	
SEP	BDL	.020 <T	
OCT	BDL	BDL	
NOV	.030 <T	.020 <T	
	BDL	.020 <T	
DEC	BDL	BDL	
	BDL	.020 <T	
URANIUM (UG/L)			DET'N LIMIT = .020 GUIDELINE = 20. (A2)
JAN	.200	.100	
FEB	.210	.080 <T	
MAR	.210	.090 <T	
APR	.210	.080 <T	
MAY	.200 <T	.080 <T	
JUN	.200 <T	.070 <T	
	.210	.160 <T	
JUL	.210	.150 <T	
AUG	.220	.150 <T	
SEP	.270	.130 <T	
OCT	.240	.150 <T	
NOV	.210	.090 <T	
	.200 <T	.080 <T	
DEC	.170 <T	.050 <T	
	.200 <T	.110 <T	
VANADIUM (UG/L)			DET'N LIMIT = .050 GUIDELINE = 100 (H)
JAN	.390 <T	.250 <T	
FEB	.210 <T	.140 <T	
MAR	.230 <T	.170 <T	
APR	.190 <T	.090 <T	
MAY	.290 <T	.210 <T	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
JUN	.220 <T	.160 <T	
	.300 <T	.170 <T	
JUL	.300 <T	.180 <T	
AUG	.350 <T	.240 <T	
SEP	.600	.220 <T	
OCT	.360 <T	.250 <T	
NOV	.330 <T	.230 <T	
	.280 <T	.160 <T	
DEC	.290 <T	.290 <T	
	.340 <T	.250 <T	

ZINC (UG/L) DET'N LIMIT = .001 GUIDELINE = 5000. (A3)

JAN	4.300	4.200
FEB	66.000	4.700
MAR	18.000	4.100
APR	4.300	5.200
MAY	13.000	3.800
JUN	3.900	3.600
	1.300	3.900
JUL	4.200	4.800
AUG	4.000	5.400
SEP	5.900	5.000
OCT	3.200	1.800
NOV	1.100	1.600
	1.100	1.500
DEC	1.800	1.800
	2.100	1.500

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
CHLOROPHENOLS			
246-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 20.	GUIDELINE = 5000 (B1)
JUN	BDL	ILA	
NOV	BDL	30.000 <T	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
PESTICIDES & PCB			
ALPHA BHC (NG/L)		DET'N LIMIT = 1.000	GUIDELINE = 700 (C)
JAN	BDL	BDL	
FEB	2.000 <T	2.000 <T	
MAR	BDL	BDL	
APR	3.000 <T	BDL	
MAY	2.000 <T	1.000 <T	
JUN	BDL	BDL	
	2.000 <T	2.000 <T	
JUL	2.000 <T	2.000 <T	
AUG	BDL	BDL	
SEP	2.000 <T	2.000 <T	
OCT	2.000 <T	2.000 <T	
NOV	3.000 <T	3.000 <T	
	BDL	2.000 <T	
DEC	3.000 <T	2.000 <T	
	IQU	IQU	
LINDANE (NG/L)		DET'N LIMIT = 1.000	GUIDELINE = 4000 (A1)
JAN	BDL	BDL	
FEB	BDL	BDL	
MAR	BDL	BDL	
APR	BDL	BDL	
MAY	BDL	BDL	
JUN	BDL	BDL	
	BDL	BDL	
JUL	BDL	BDL	
AUG	BDL	BDL	
SEP	BDL	BDL	
OCT	BDL	BDL	
NOV	1.000 <T	1.000 <T	
	BDL	BDL	
DEC	BDL	BDL	
	IQU	IQU	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
PHENOLICS (UG/L)	PHENOLICS	DET'N LIMIT = 0.2	GUIDELINE = 2.00 (A3)
JAN	.800 <T	.600 <T	
FEB	.600 <T	.600 <T	
MAR	BDL	BDL	
APR	BDL	BDL	
MAY	.200 <T	BDL	
JUN	3.000	BDL	
	1.000 <T	.200 <T	
JUL	1.000	.200 <T	
AUG	.400 <T	1.200	
SEP	BDL	BDL	
OCT	.800 <T	.400 <T	
NOV	.600 <T	.200 <T	
	.600 <T	.600 <T	
DEC	.600 <T	.600 <T	
	.600 <T	1.000	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
VOLATILES			
BENZENE (UG/L)		DET'N LIMIT = .050	GUIDELINE = 5.0 (81)
APR	BDL	.300 <T	
MAY	BDL	BDL	
JUN	.100 <T	.100 <T	
	BDL	.050 <T	
JUL	BDL	.400 <T	
AUG	.100 <T	.050 <T	
SEP	BDL	BDL	
OCT	.050 <T	.100 <T	
NOV	BDL	.150 <T	
	BDL	.100 <T	
DEC	.100 <T	.200 <T	
	.300 <T	.600	
TOLUENE (UG/L)		DET'N LIMIT = .050	GUIDELINE = 24.0 (84)
APR	BDL	BDL	
MAY	BDL	.050 <T	
JUN	BDL	.150 <T	
	.050 <T	.200 <T	
JUL	BDL	.100 <T	
AUG	.100 <T	.150 <T	
SEP	BDL	BDL	
OCT	BDL	.050 <T	
NOV	BDL	BDL	
	.100 <T	BDL	
DEC	.150 <T	.100 <T	
	.100 <T	.300 <T	
ETHYLBENZENE (UG/L)		DET'N LIMIT = .050	GUIDELINE = 2.4 (84)
APR	BDL	.050 <T	
MAY	BDL	BDL	
JUN	BDL	.100 <T	
	.050 <T	.100 <T	
JUL	BDL	.100 <T	
AUG	.050 <T	.100 <T	
SEP	BDL	.050 <T	
OCT	.150 <T	.100 <T	
NOV	BDL	.100 <T	
	.100 <T	BDL	
DEC	.050 <T	BDL	
	.050 <T	.100 <T	
P-XYLENE (UG/L)		DET'N LIMIT = .100	GUIDELINE = 300 (84)
APR	BDL	BDL	
MAY	BDL	BDL	
JUN	BDL	BDL	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
M-XYLENE (UG/L) — DET'N LIMIT = .100 — GUIDELINE = 300 (B4)			
JUN	BDL	.100	
JUL	BDL	BDL	
AUG	BDL	BDL	
SEP	BDL	BDL	
OCT	BDL	BDL	
NOV	BDL	BDL	
	BDL	BDL	
DEC	BDL	BDL	
	BDL	BDL	
O-XYLENE (UG/L) — DET'N LIMIT = .050 — GUIDELINE = 300 (B4)			
APR	BDL	BDL	
MAY	BDL	BDL	
JUN	BDL	.100 <T	
	BDL	.100 <T	
JUL	BDL	.200 <T	
AUG	.100 <T	.200 <T	
SEP	BDL	BDL	
OCT	.100 <T	.100 <T	
NOV	BDL	.200 <T	
	BDL	BDL	
DEC	BDL	BDL	
	BDL	BDL	
STYRENE (UG/L) — DET'N LIMIT = .050 — GUIDELINE = 46.5 (D2)			
APR	BDL	BDL	
MAY	BDL	BDL	
JUN	.050 <T	.050 <T	
	BDL	.050 <T	
JUL	BDL	.150 <T	
AUG	.100 <T	.100 <T	
SEP	BDL	BDL	
OCT	BDL	.050 <T	
NOV	BDL	.150 <T	
	BDL	BDL	
DEC	BDL	BDL	
	BDL	.050 <T	
CHLOROFORM (UG/L) — DET'N LIMIT = .100 — GUIDELINE = 350 (A1+)			
OCT	.650	BDL	
NOV	.150 <T	BDL	
	BDL	BDL	
DEC	.150 <T	BDL	
	.200 <T	BDL	
APR	BDL	20.600	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
MAY	BDL	23.800	
JUN	BDL	23.300	
	BDL	11.400	
JUL	BDL	23.800	
AUG	.500 <T	24.400	
SEP	.200 <T	17.500	
OCT	BDL	25.300	
NOV	BDL	20.400	
	1.200	8.900	
DEC	BDL	12.900	
	.200 <T	32.100	
1,2 DICHLOROETHANE (UG/L)		DET'N LIMIT = .050	GUIDELINE = 5.0 (D1)
APR	BDL	BDL	
MAY	BDL	BDL	
JUN	BDL	BDL	
	BDL	BDL	
JUL	BDL	.100 <T	
AUG	BDL	BDL	
SEP	BDL	BDL	
OCT	BDL	BDL	
NOV	BDL	BDL	
	BDL	BDL	
DEC	BDL	BDL	
	BDL	BDL	
DICHLOROBROMOMETHANE (UG/L)		DET'N LIMIT = .050	GUIDELINE = 350 (A1+)
APR	BDL	15.000	
MAY	BDL	16.200	
JUN	BDL	14.100	
	BDL	9.650	
JUL	BDL	9.500	
AUG	.150 <T	12.750	
SEP	.200 <T	13.450	
OCT	BDL	14.050	
NOV	BDL	7.200	
	.200 <T	10.900	
DEC	BDL	9.800	
	BDL	12.000	
CHLORODIBROMOMETHANE (UG/L)		DET'N LIMIT = .100	GUIDELINE = 350 (A1+)
APR	BDL	11.500	
MAY	BDL	11.000	
JUN	BDL	11.400	
	BDL	6.800	
JUL	BDL	4.000	
AUG	BDL	9.400	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED	
T-CHLOROETHYLENE (UG/L)		DET'N LIMIT = .050	GUIDELINE = 10.0 (C2)
SEP	.200 <T	11.900	
OCT	BDL	10.900	
NOV	BDL	3.300	
	BDL	8.900	
DEC	BDL	7.400	
	BDL	6.800	
APR	BDL	BDL	
MAY	BDL	BDL	
JUN	BDL	BDL	
	BDL	BDL	
JUL	BDL	BDL	
AUG	.100 <T	BDL	
SEP	BDL	BDL	
OCT	BDL	.100 <T	
NOV	.050 <T	BDL	
	BDL	BDL	
DEC	BDL	BDL	
	BDL	.100 <T	
BROMOFORM (UG/L)		DET'N LIMIT = .200	GUIDELINE = 350 (A1+)
APR	BDL	1.600 <T	
MAY	BDL	1.000 <T	
JUN	BDL	.800 <T	
	BDL	.400 <T	
JUL	BDL	.200 <T	
AUG	BDL	.600 <T	
SEP	BDL	1.600 <T	
OCT	BDL	1.000 <T	
NOV	BDL	.400 <T	
	BDL	1.400 <T	
DEC	BDL	1.600 <T	
	BDL	1.000 <T	
TOTL TRIHALOMETHANES (UG/L)		DET'N LIMIT = .500	GUIDELINE = 350 (A1)
APR	BDL	48.700	
MAY	BDL	52.000	
JUN	BDL	49.600	
	BDL	28.250	
JUL	BDL	37.500	
AUG	.650 <T	47.150	
SEP	.600 <T	44.450	
OCT	BDL	51.250	
NOV	BDL	34.900	
	1.400 <T	30.100	
DEC	BDL	31.700	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WTP 1988

		WATER TREATMENT PLANT	DISTRIBUTION SYSTEM
		RAW	TREATED
DEC	BDL		51.900

Table 6

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
STANDARD PLATE COUNT MEMBRANE	CT/ML	0	500/ML(A1)
FILTRATION			
P/A BOTTLE		0	0 (A1*)
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100mL(A1)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
CHLOROAROMATICS			
HEXACHLOROBUTADIENE	NG/L	1.000	450. (D4)
1,2,3-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,4-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.000	38000 (D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.000	10000 (D4)
HEXACHLOROBENZENE	NG/L	1.0	10. (C1)
HEXACHLOROETHANE	NG/L	1.000	1900. (D4)
OCTACHLOROSTYRENE	NG/L	1.000	N/A
PENTACHLOROBENZENE	NG/L	1.000	74000 (D4)
2,3,6-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,4,5-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,6,A-TRICHLOROTOLUENE	NG/L	5.000	N/A
CHLOROPHENOLS			
2,3,4-TRICHLOROPHENOL	NG/L	50.	N/A
2,3,4,5-TETRACHLOROPHENOL	NG/L	50.	N/A
2,3,5,6-TETRACHLOROPHENOL	NG/L	50.	N/A
2,4,5-TRICHLOROPHENOL	NG/L	50.	2600000 (D4)
2,4,6-TRICHLOROPHENOL	NG/L	50.	5000. (B1)
PENTACHLOROPHENOL	NG/L	50.	60000. (B1)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD PH	DMSNLESS	N/A	6.5-8.5(A4)
FIELD TEMPERATURE	^{o}C	N/A	<15 ^{o}C(A1)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	.200	30-500(A4)
CALCIUM	MG/L	.100	100. (F2)
CYANIDE	MG/L	.001	.20(A1)
CHLORIDE	MG/L	.200	250. (A3)
COLOUR	TCU	.5	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.	400. (F2)
FLUORIDE	MG/L	.01	2.4 (A1)
HARDNESS	MG/L	.50	80-100(A4)
MAGNESIUM	MG/L	.05	30. (F2)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
NITRITE	MG/L	.001	1.0 (A1)
TOTAL NITRATES	MG/L	.02	10. (A1)
NITROGEN TOTAL KJELDAHL	MG/L	.02	N/A
PH	DIMENSIONLESS	N/A	6.5-8.5(A4)
PHOSPHORUS FIL REACT	MG/L	.0005	N/A
PHOSPHORUS TOTAL	MG/L	.002	.40(F2)
TOTAL SOLIDS	MG/L	1.	500. (A3)
TURBIDITY	FTU	.02	1.0 (A1)
METALS			
ALUMINUM	UG/L	.050	100. (A4)
ANTIMONY	UG/L	.050	146. (D4)
ARSENIC	UG/L	.050	50. (A1)
BARIUM	UG/L	.020	1000. (A1)
BORON	UG/L	.200	5000. (A1)
BERYLLIUM	UG/L	.010	0.20 (H)
CADMIUM	UG/L	.050	5.0 (A1)
COBALT	UG/L	.020	1000. (H)
CHROMIUM	UG/L	.100	50. (A1)
COPPER	UG/L	.100	1000. (A3)
IRON	UG/L	5.0	300. (A3)
MERCURY	UG/L	.01	1.0 (A1)
MANGANESE	UG/L	.050	50. (A3)
MOLYBDENUM	UG/L	.020	500. (H)
NICKEL	UG/L	.100	50. (F3)
LEAD	UG/L	.020	50. (A1)
SELENIUM	UG/L	.200	10. (A1)
SILVER	UG/L	.020	50. (A1)
STRONTIUM	UG/L	.100	2000. (H)
THALLIUM	UG/L	.010	13. (D4)
TITANIUM	UG/L	.100	N/A
URANIUM	UG/L	.020	20. (A2)
VANADIUM	UG/L	.020	100. (H)
ZINC	UG/L	.020	5000. (A3)
PHENOLICS			
PHENOLICS (UNFILTERED REACTIVE)	UG/L	.2	2.0 (A3)
PESTICIDES & PCB			
ALDRIN	NG/L	1.0	700. (A1)
AMETRINE	NG/L	50.	300000. (D3)
ATRAZINE	NG/L	50.	60000. (B3)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700. (G)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300. (G)
GAMMA HEXACHLOROCYCLOHEXANE(LINDANE)	NG/L	1.0	4000. (A1)
ALPHA CHLORDANE	NG/L	2.0	7000. (A1)
GAMMA CHLORDANE	NG/L	2.0	7000. (A1)
BLADEX	NG/L	100.	10000. (B3)
DIELDRIN	NG/L	2.0	700. (A1)
METHOXYCHLOR	NG/L	5.0	100000. (A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000. (D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	4.0	74000. (D4)
ENDRIN	NG/L	4.0	200. (A1)
ENDOSULFAN SULPHATE(THIODAN SULPHATE)	NG/L	4.0	N/A
HEPTACHLOR EPOXIDE	NG/L	1.0	3000. (A1)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
HEPTACHLOR	NG/L	1.0	3000.	(A1)
METOLACHLOR	NG/L	500.	50000.	(B3)
MIREX	NG/L	5.0	N/A	
OXYCHLORDANE	NG/L	2.0	N/A	
O,P-DDT	NG/L	5.0	30000.	(A1)
PCB	NG/L	20.0	3000.	(A2)
O,P-DDD	NG/L	5.0	N/A	
PPDDE	NG/L	1.0	30000.	(A1)
PPDDT	NG/L	5.0	30000.	(A1)
ATRATONE	NG/L	50.	N/A	
ALACHLOR	NG/L	500.	35000.	(D2)
PROMETONE	NG/L	50.	52500.	(D3)
PROPAZINE	NG/L	50.	16000.	(D2)
PROMETRYNE	NG/L	50.	1000.	(B3)
SENCOR (METRIBUZIN)	NG/L	100.	80000.	(B2)
SIMAZINE	NG/L	50.	10000.	(B3)
POLYAROMATIC HYDROCARBONS				
PHENANTHRENE	NG/L	10.0	N/A	
ANTHRACENE	NG/L	1.0	N/A	
FLUORANTHENE	NG/L	20.0	42000.	(D4)
PYRENE	NG/L	20.0	N/A	
BENZO(A)ANTHRACENE	NG/L	20.0	N/A	
CHRYSENE	NG/L	50.0	N/A	
DIMETHYL BENZO(A)ANTHRACENE	NG/L	5.0	N/A	
BENZO(E)PYRENE	NG/L	50.0	N/A	
BENZO(B)FLUORANTHENE	NG/L	10.0	N/A	
PERYLENE	NG/L	10.0	N/A	
BENZO(K)FLUORANTHENE	NG/L	1.0	N/A	
BENZO(A)PYRENE	NG/L	5.0	10.	(B1)
BENZO(G,H,I)PERYLENE	NG/L	20.0	N/A	
DIBENZO(A,H)ANTHRACENE	NG/L	10.0	N/A	
INDENO(1,2,3-C,D)PYRENE	NG/L	20.0	N/A	
BENZO(B)CHRYSENE	NG/L	2.0	N/A	
CORONENE	NG/L	10.0	N/A	
SPECIFIC PESTICIDES				
TOXAPHENE	NG/L	N/A	5000.	(A1)
2,4,5-TRICHLOROBUTYRIC ACID (2,4,5-T)	NG/L	50.	280000.	(B1)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.	100000.	(A1)
2,4-DICHLORORPHENOXYBUTYRIC ACID	NG/L	200.	18000.	(B3)
2,4-D PROPIONIC ACID	NG/L	100.	N/A	
DICAMBA	NG/L	100.	87000.	(B3)
PICHLORAM	NG/L	100.	2450000.	(D3)
SILVEX (2,4,5-TP)	NG/L	50.	10000.	(A1)
DIAZINON	NG/L	20.	14000.	(A1)
DICHLOROVOS	NG/L	20.	N/A	
DURSBAN	NG/L	20.	N/A	
ETHION	NG/L	20.	35000.	(G)
GUTHION	NG/L	N/A	N/A	
MALATHION	NG/L	20.	160000.	(G)
MEVINPHOS	NG/L	20.	N/A	
METHYL PARATHION	NG/L	50.	7000.	(B3)
METHYLTRITHION	NG/L	20.	N/A	
PARATHION	NG/L	20.	35000.	(B1)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
PHORATE (THIMET)	NG/L	20.	35. (D2)
RELDAN	NG/L	20.	N/A
RONNEL	NG/L	20.	N/A
AMINOCARB	NG/L	N/A	N/A
BENOMYL	NG/L	N/A	N/A
BUX (METALKAMATE)	NG/L	2000.	N/A
CARBOFURAN	NG/L	2000.	18000. (D3)
CICP (CHLORPROPHAM)	NG/L	2000.	350000. (G)
DIALLATE	NG/L	2000.	30000. (H)
EPTAM	NG/L	2000.	N/A
IPC	NG/L	2000.	N/A
PROPOXUR (BAYGON)	NG/L	2000.	90000. (G)
SEVIN (CARBARYL)	NG/L	200.	70000. (A1)
SUTAN (BUTYLATE)	NG/L	2000.	245000. (D3)
VOLATILES			
BENZENE	UG/L	.050	5.0 (B1)
TOLUENE	UG/L	.050	24.0 (B4)
ETHYLBENZENE	UG/L	.050	2.4 (B4)
PARA-XYLENE	UG/L	.100	300. (B4)
META-XYLENE	UG/L	.100	300. (B4)
ORTHO-XYLENE	UG/L	.050	300. (B4)
1,1-DICHLOROETHYLENE	UG/L	.100	7.0 (D1)
ETHLYENE DIBROMIDE	UG/L	.05	50. (G)
METHYLENE CHLORIDE	UG/L	.500	1750. (D3)
TRANS-1,2-DICHLOROETHYLENE	UG/L	.100	350. (D3)
1,1-DICHLOROETHANE	UG/L	.100	N/A
CHLOROFORM	UG/L	.100	350. (A1+)
1,1,1-TRICHLOROETHANE	UG/L	.020	200. (D1)
1,2-DICHLOROETHANE	UG/L	.050	5.0 (D1)
CARBON TETRACHLORIDE	UG/L	.200	5.0 (D1)
1,2-DICHLOROPROPANE	UG/L	.050	10.0 (G)
TRICHLOROETHYLENE	UG/L	.100	5.0 (D1)
DICHLOROBROMOMETHANE	UG/L	.050	350. (A1+)
1,1,2-TRICHLOROETHANE	UG/L	.050	.60(D4)
CHLORODIBROMOMETHANE	UG/L	.100	350. (A1+)
TETRACHLOROETHYLENE	UG/L	.050	10.0 (C2)
BROMOFORM	UG/L	.200	350. (A1+)
1,1,2,2-TETRACHLOROETHANE	UG/L	.050	0.17(D4)
CHLOROBENZENE	UG/L	.100	1510. (D3)
1,4-DICHLOROBENZENE	UG/L	.100	5.0 (B1)
1,3-DICHLOROBENZENE	UG/L	.100	130. (G)
1,2-DICHLOROBENZENE	UG/L	.050	200. (B1)
TRIFLUOROCHLOROTOLUENE	UG/L	.10[illegible]	N/A
TOTAL TRIHALOMETHANES	UG/L	.500	350. (A1)
STYRENE	UG/L	.05	46.5 (D2)